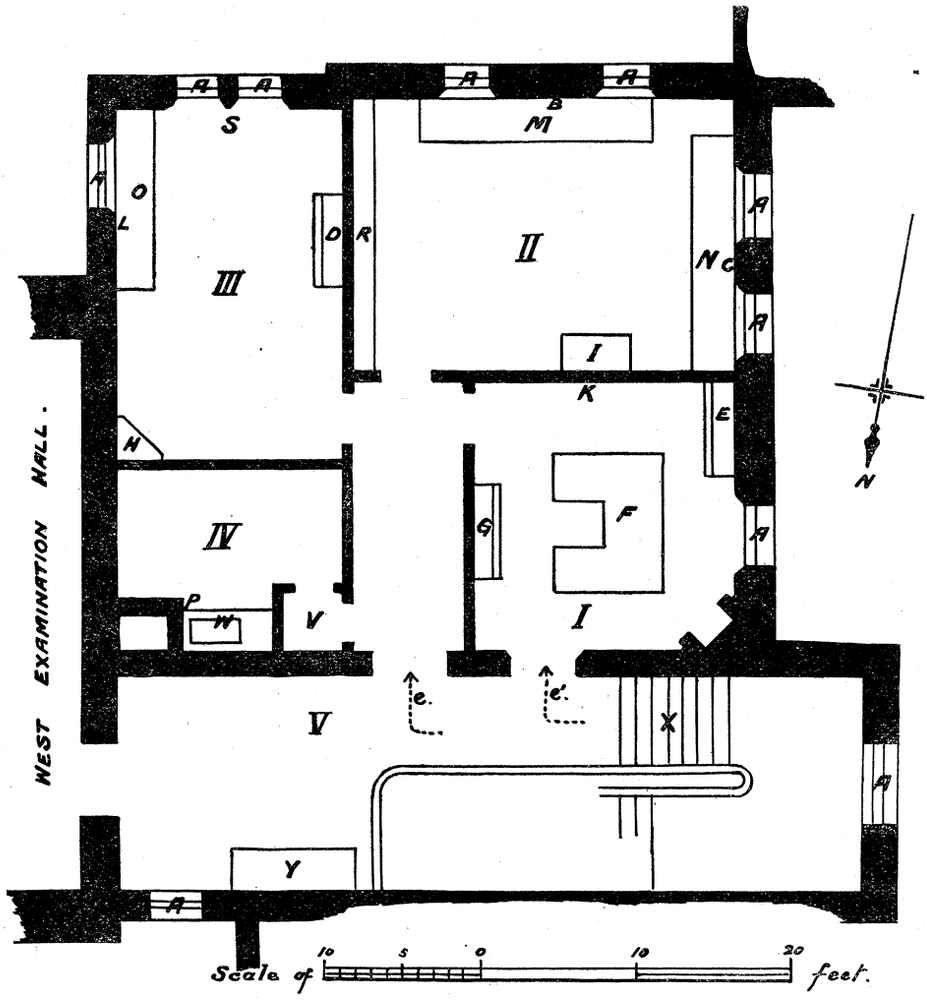
related we may judge by what was said above, but there are reasons for believing them to differ from each other as they both differ from heat, although all alike are forms of energy. Actinic absorption, like coloric absorption, is attended with decomposition, but so far as the former is attended with or followed by an aggregation or combination of elements, as with chemical affinity, it is also a force, but molar rather than molecular or atomic. In distinguishing between these forms of matter, I adopt the principle laid down by Mr. Grant Allen, although not all the applications he makes of them, and I believe that in the recognition of the truth of those principles will be found the solution of many scientific problems.

C. STANILAND WAKE.

THE PSYCHOLOGICAL LABORATORY IN THE UNIVERSITY OF TORONTO.[1]

IN the spring of 1891 an appropriation of $1,100 was made for the equipment of a laboratory for experimental psychology at the instance of the writer. A suite of rooms, of which the accompanying cut gives the dimensions and arrangement, was set apart for the use of this department. The laboratory is located at the west end of the restored University College building on the first (not the ground) floor. It is isolated entirely from the general work of the building, being over the rooms of the physical department. The rooms have light exposure from three sides. The room which is used for students' demonstration and practical work (I. in the plan) is cut off from the research rooms, thus making



A, A, A, Windows.

I. Demonstrating-room and work-room for undergraduates. G. Work-table; E. Book-cases; K. Blackboard; F. Demonstration-table; e'. Students' entrance; e. Professor's entrance.

II. Research-room. M, N. Work-tables; B, C. Lockers, movable incandescent lights; I. Chart-case, movable tables; R. Instrument-cases.

III. Professor's Research-room. O. Work-table; D. Book-cases; H. Closet for tools, &c ; L. Movable incandescent light, lockers; S. Writing-desk.

IV. Dark-room. W. Sink; V. Vestibule; P. Incandescent light.

V. Private hall. X. Stairs; e. Professor's entrance; Y. Instrument-cases.

interruptions to the latter from noise, etc., unlikely. For the same reason, the central hall is laid with cocoa matting. The work-tables of the research rooms (II. and III.) get light from the east, south, and west, a variety which is of great value, especially as the east exposure (Room III.) has reflected light from the walls of the main building (this is also partly the case with the light from the west windows, Rooms I. and II.). The rooms are artificially lighted by combination gas and electric chandeliers from the ceilings, and have besides movable incandescent lamps over the work-tables. The dark room is also furnished with incandescent lights. The floors throughout are carefully laid in hard wood. The

[1] The accompanying plan is published at the suggestion of several psychologists who have borrowed and examined it; it is thought that the details may be of use to professors, boards, or trustees who are contemplating the providing of laboratories.

work-tables are braced diagonally from the walls by iron rods. The rooms are heated by steam radiators. The walls and ceilings are finished in dull white and the woodwork in dark walnut, colors being avoided in order to keep the physiological conditions of sight normal. Natural and colored light can be let into the dark room through the south wall. The central hall is lighted through glass panels in the doors.

The fittings of the laboratory have cost about $450 — a grant additional to the appropriation of $1,100 for instruments. This does not include, however, the arrangements for lighting, heating, and the special flooring. It is probable that the cost would be slightly more in the United States. Of the original amount appropriated, moreover, $300 is an annual allowance for the maintenance of the laboratory. The writer hopes, also, to have soon a paid assistant, who will be constantly at work in the rooms.

The laboratory will, it is hoped, serve two main purposes: First, it is used to illustrate the undergraduate courses in psychology in the university; and, second, it is designed to serve as a centre for advanced research in the new lines of experimental work. Being the only foundation of the kind in Canada,[1] it will represent what we are doing in this line in the Dominion. The Department of Education of Ontario undertakes with great liberality to publish the researches of students who do work of real merit, and to distribute them generously. Publications issued from other such centres everywhere will be received in return with much gratitude; and new ideas in matters of technique, arrangement, etc., especially detailed notices of new pieces of apparatus, reprints from the journals, and announcements of new discoveries, will be welcome. J. MARK BALDWIN.

[1] The first in the British Dominion as far as my information goes.

NOTES AND NEWS.

AT a meeting of the Royal Geographical Society on Feb. 22, Mr. Theodore Bent read before a large audience a paper on his recent exploration among the Zimbabwe and other ruins. The paper, says *Nature*, was one of great interest. Mr. Bent said that, with his wife and Mr. Robert Swan, he went to Mashonaland primarily to examine the ruins of the Great Zimbabwe. These ruins, so named to distinguish them from the numerous minor Zimbabwes scattered over the country, were situated in south latitude 20° 16′ 30″, and east longitude 31° 10′ 10″, at an elevation of 3,300 feet above the sea-level, and formed the capital of a long series of such ruins stretching up the whole length of the west side of the Sabæ River. They covered a vast area of ground, and consisted of the large circular building on a gentle rise with a network of inferior buildings extending into the valley below, and the labyrinthine fortress on the hill, about 400 feet above, naturally protected by huge granite bowlders and a precipice running round a considerable portion of it. Mr. Bent gave a minute description of the ruins, drawing attention to evidence that their ancient inhabitants must have been given to the grosser forms of native worship. Perhaps the most interesting of their finds in one portion were those in connection with the manufacture of gold. Mr. Bent held that the ruins and the things in them were not in any way connected with any known African race; the objects of art and the special cult were foreign to the country altogether, where the only recognized form of religion was, and had been since the days when the early Portuguese explorers penetrated into it and El Masoudi wrote, that of ancestor worship. It was also obvious that the ruins formed a garrison for the protection of a gold-producing race in remote antiquity. So we must look around for such a race outside the limits of Africa, and it was in Arabia that we found the object of our search. All ancient authorities speak of Arabian gold in terms of extravagant praise. Little, if any, gold came from Arabia itself; and here in Africa gold was produced in large quantities, both from alluvial and from quartz, from the remotest ages. A cult practised in Arabia in early times was also practised here; hence there was little room for doubt that the builders and workers of the Great Zimbabwe came from the Arabian peninsula, He had no hesitation in assigning this enterprise to Arabian origin, and to a pre-Mahommedan period.

— The United States Hydrographic Office makes a report of the magnetic storm of Feb. 13–14, 1892, as recorded by the self-registering magnetic instruments of the United States Naval Observatory, Washington, D.C. These records of this unusually severe magnetic storm are of especial interest as occurring at the same time as the fine displays of auroræ and the appearance of a large group of sun spots. The magnetic storm commenced suddenly at 12.40 A.M. (75th meridian time), Feb. 13, with a movement of the north end of the declination magnet to the westward and a rapid increase in the horizontal and decrease in the vertical components of the earth's magnetic force. The north end of the declination magnet remained to the westward of its normal position until 10.30 A.M, when it crossed to the eastward, all the time oscillating violently, and did not return to its normal position until 8 P.M. of the 13th, after which it kept oscillating on each side of its mean position until the end of the storm. It registered a change of direction of 1½°. The first increase in the horizontal force was followed by a rapid decrease, the force falling to much less than its usual strength, with rapid changes. Its change during the storm was 2½ per cent of its mean strength. The vertical force decreased so much that the sensitive balanced magnet used to record it was upset at 8 P.M. of the 13th, and its further record lost. The auroræ were seen at Washington at about 2 A.M. and 7.30 P.M. of the 13th, the latter time being marked by an unusually disturbed condition of the magnets.

— The usual monthly meeting of the Royal Meteorological Society was held on Wednesday evening, the 17th of February. A paper on "The Untenability of an Atmospheric Hypothesis of Epidemics" was read by the Hon. Rollo Russell. The author is of opinion that no kind of epidemic or plague is conveyed by the general atmosphere, but that all epidemics are caused by human conditions and communications capable of control. In this paper he investigates the manner of the propagation of influenza, and gives the dates of the outbreaks in 1890 at a large number of islands and other places in various parts of the world. Mr. Russell says that there is no definite or known atmospheric quality or movement on which the hypothesis of atmospheric conveyance can rest, and when closely approached it is found to be no more available than a phantom. Neither lower nor upper currents have ever taken a year to cross Europe from east to west, or adjusted their progress to the varying rate of human intercourse. Like other maladies of high infective capacity, influenza has spread most easily, other things being equal, in cold, calm weather, when ventilation in houses and railway cars is at a minimum, and when perhaps the breathing organs are most open to attack. But large and rapid communications seem to be of much more importance than mere climatic conditions. Across frozen and snow-covered countries and tropical regions it is conveyed at a speed corresponding, not with the movements of the atmosphere, but with the movements of population and merchandise. Its indifference to soil and air, apart from human habits depending on these, seems to eliminate all considerations of outside natural surroundings, and to leave only personal infectiveness, with all which this implies of subtle transmission, to account for its propagation. "The Origin of Influenza Epidemics" was the title of a paper by Mr. H. Harries. The author has made an investigation into the facts connected with the great eruption of Krakatoa in 1883, and the atmospheric phenomena which were the direct outcome of that catastrophe. He has come to the conclusion that the dust derived from the interior of the earth may be considered the principal factor concerned in the propagation of the recent influenza epidemics, and that, as this volcanic dust invaded the lower levels of the atmosphere, so a peculiar form of sickness assailed man and beast. A "Report on the Phenological Observations for 1891" was made by Mr. E. Hawley. This report differs in many respects